Of 3910[1] square miles, the whole area of the district, 3548 square miles, or about ninety per cent, are under forest.

The following statement gives the leading details :

Kánara Forests,[2] 1882.

Divisions.	Sub-Divisions.	Forest Area.					
		Reserved.		Protected.		Total.	
		Square miles.	Acres.	Square miles.	Acres.	Square miles.	Acres.
Northern.	Haliyál ...	251·86	161,191	...	...	251·86	161,191
	Supa ...	...	...	723·35	462,944	723·35	462,944
	Kárwár ...	214·44	137,246	...	...	214·44	137,246
Central.	Yelláp ur ...	...	...	364·28	233,140	364·28	233,140
	Mundgod ...	55·15	35,296	106·72	68,304	161·87	103,600
	Ankola ...	128·21	82,060	116·83	74,775	245·04	156,835
	Kumta ...	...	...	300·	192,000	300·	192,000
Southern.	Sirsi	31·01	21,770	665·98	426,230	699·99	448,000
	Siddápur ...	...	..	280·	179,200	280·	179,200
	Honávar ...	...	...	185·	118,400	185·	118,400
	Bhatkal ...	...	...	122·82	78,609	122·82	78,609
	Total ...	683·67	437,563	2864·98	1,833,602	3548·65	2,271,165

The forests are entirely the property of Government ; in protected forests certain privileges are allowed. Reserved areas have still to be chosen in Supa, Yelláp ur, Kumta, Siddápur, Honávar, and Bhatkal.

Description.

The forest area may conveniently be divided into three sections : the tableland above the Sahyádris, the main range of the Sahyádris, and the western spurs of the Sahyádris. In the tableland above the Sahyádris the commonest rocks are clay-slate and quartzite. On the lower lands the soil is mostly black with an underlayer of red, which crops up where the surface is wavy. Where teak prevails the soil is lighter in colour, loose, and mixed with quartz. Except in open tilled spaces and where the surface is rock, and along the more thickly peopled eastern frontier where they have been cleared away, the whole country is covered with trees. West from the eastern frontier towards the Sahyádri hills, tillage becomes rare, and there are splendid forests of teak, blackwood, terminalias, and other trees eighty to 150 feet high, with fine clean stems sixty to ninety feet high and five to twelve feet in girth. Nearer the Sahyádris the country roughens into uplands and hills seamed by water-courses and valleys with rich rice lands and spice gardens. There are also patches of evergreen forest with splendid trees not generally found in the leaf-shedding forests further east.[3]

The central Sahyádri forest belt, though it includes some large iron-clay plateaus with nothing but scrub and grass, has some of the

[1] The Forest Section is contributed by Colonel W. Peyton, Conservator of Forests, S.D.

[2] In unsurveyed sub-divisions the forest areas are subject to correction.

[3] Among these trees are the Artocarpus, Calophyllum, Dipterocarpus, Eugenia Cedrela Toona, Antiaris, Sterculia, Vateria, and the Caryota urens or wild sago palm.

Chapter II. Production. Forests.

finest forests in the district. The chief of these, in hills of clay-slate and quartz, are the magnificent teak forests of the Kálinadi and Káneri rivers which run through Supa and Yellápur and of the Bedtihalla and Gangavali rivers which divide Yellápur from Sirsi.

In the western or coast belt the lowlands are under tillage, and most of the forests are found on the spurs that run west from the Sahyádris, in some cases to the sea. The soil is red and gravelly, ill suited for teak, which when found is stunted and insignificant. Bamboos of several valuable kinds grow over the whole of Kánara, sometimes mixed and sometimes alone.

History.

Before Kánara came under British rule, its forests supplied the ship-building yards of the famous Haidar Ali (1761-1782) with the finest teak and other timber. Teak, blackwood, and sandalwood even when growing in occupied land have always been considered the property of the state, and so highly were the forests valued that no portion of them has ever been alienated.

Staff.

Between 1859 and 1865 gradual changes in the establishment have raised the monthly cost from £48 to £103 (Rs. 480 - Rs. 1030).[1]

In December 1865 the district was divided into two Deputy Conservators' charges, one above and one below the Sahyádris, with establishments which together represented a monthly cost of about £300 (Rs. 3000).[2] In 1870, under the advice of Mr. D. Brandis, Ph.D., Inspector-General of Forests, Major now Lieutenant-Colonel W. Peyton, one of the two Deputy Conservators, was promoted to be a Conservator of Forests of the fourth grade, and placed in charge of the Southern Division comprising Kánara, Belgaum, Dhárwár, and Kaládgi. At the same time an establishment was sanctioned representing a monthly charge of £290 (Rs. 2900).[3]

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[1] The details of the 1859 staff were: An assistant conservator of forests, one clerk, two overseers, and one *gumásta*. The details of the 1865 staff were: one assistant conservator of forests, with, for office one accountant, one writer, one *gumásta* and four messengers, and for district work one sub-assistant conservator of forests, one overseer, three sub-overseers, three *mutsaddis*, three writers, seven messengers, and sixty foresters.

[2] The details were: In the forests above the Sahyádris, one Deputy Conservator on £60 (Rs. 600) a month with £20 (Rs. 200) travelling allowance. His office establishment was one clerk and two messengers costing monthly £6 12*s.* (Rs. 66), and his district establishment six overseers, six writers, twelve first class foresters, and twenty-four second class foresters at a monthly cost of £65 (Rs. 650). In the forests below the Sahyádris there was a Deputy Conservator on £50 (Rs. 500) a month with £20 (Rs. 200) travelling allowance; an office of one clerk, one writer and one messenger at a total monthly cost of £5 12*s.* (Rs. 56), and a district establishment of ten writers, two *havaldárs*, and thirty messengers at a monthly cost of £46 8*s.* (Rs. 464). Besides this a forest accountant was sanctioned for the Collector's office on £4 (Rs. 40) a month, and a timber depôt establishment for the coast, consisting of one superintendent, one storekeeper, one clerk, one measurer, and six peons at a monthly cost of £28 12*s.* (Rs. 286). The total monthly cost of the new establishment amounted in both divisions to £306 4*s.* (Rs. 3062).

[3] The details were: An office of two clerks, two writers and four messengers at a monthly cost of £15 4*s.* (Rs. 152), and under the mámlatdárs and mahálkaris eleven writers at a monthly cost of £16 10*s.* (Rs. 165); Forest, eight inspectors and sixty foresters at a monthly cost of £104 (Rs. 1040); Coast Depôt, one superintendent, one storekeeper, one clerk, one measurer and six messengers at a monthly cost of £28 12*s.* (Rs. 286); Inland Depôt, six storekeepers and six foresters at a monthly cost of £19 16*s.* (Rs. 198), giving a total monthly cost of £184 2*s.* (Rs. 1841). Finally the Deputy Conservator was promoted to the second grade on a monthly salary of £70

Forests. *Staff.*

Since 1870 the chief changes have been, in 1873 the appointment of a forest accountant, in 1877 the appointment of two additional sub-assistant conservators, and in 1880 of two additional assistant conservators. Since this last addition to the staff the forests have been divided into three charges. A northern including Haliyál, Supa, and Kárwár; a central, including Yelláp ur, Mundgod, Kumta, and Ankola; and a southern, including Sirsi, Siddápur, Honávar, and Bhatkal. Each of these divisions has a Deputy or Assistant and a sub-assistant conservator. On the 1st of April 1882 the monthly cost of the permanent Kánara forest staff was £451 (Rs. 4510).[1] Besides the permanent staff a temporary establishment is sanctioned by Government from year to year. The establishment sanctioned in 1881-82 cost £3665 18*s.* (Rs. 36,659).

Duties of the Establishment.

Each of the three divisions is split into ranges, each in charge of a ranger or forester helped by a certain number of forest guards. The ranger or forester has to see that the mámlatdárs' forest accounts are properly kept, that the forest guards do their duty, that workmen are regularly and correctly paid, and that trees are properly picked and felled. The forest guards are all under the rangers, and as a rule receive their orders from them. Some of them are in charge of plantations and others of forest cuttings, but most of them, in posts two or three strong, patrol the forests or watch the lines of traffic. The guards keep a diary and submit it through the ranger to the divisional officer. A guard is expected to examine the forest within his beat, to put down fires, and report irregularities and thefts. Those on the frontiers have to examine all forest produce that leaves the district and see that the cartmen carry proper passes. These passes, one white and the other green, are issued in duplicate by mámlatdárs and forest rangers to every cartman carrying forest produce. At the frontier post the guard

(Rs. 700) and £15 (Rs. 150) travelling allowance; and a sub-assistant conservator was appointed from the 1st June 1871 on a monthly salary of £15 (Rs. 150) and £6 (Rs. 60) travelling allowance.

[1] The details are: Officials at a total monthly cost of £272 10*s.* (Rs. 2725); a Deputy Conservator of the second grade being on £70 (Rs. 700) a month with a travelling allowance of £15 (Rs. 150); two assistant conservators costing £110 (Rs. 1100), one of the first grade on £45 (Rs. 450) with travelling allowance of £15 (Rs. 150), and one of the second grade on £35 (Rs. 350) with travelling allowance of £15 (Rs. 150); and three sub-assistant conservators costing £77 10*s.* (Rs. 775), one of the first grade on £20 (Rs. 200) with travelling allowance of £8 (Rs. 80), one of the second grade on £20 (Rs. 200) with travelling allowance of £6 (Rs. 60), and one of the third grade on £17 10*s.* (Rs. 175) with travelling allowance of £6 (Rs. 60). Office is maintained at a total monthly cost of £37 4*s.* (Rs. 372), one accountant being on £7 (Rs. 70) a month, three clerks costing £9 (Rs. 90), one on £4 (Rs. 40), one on £3 (Rs. 30), and one on £2 (Rs. 20), one apprentice on £1 10*s.* (Rs. 15), four peons costing £3 4*s.* (Rs. 32), and eleven clerks under mámlatdárs and mahálkaris costing £16 10*s.* (Rs. 165). The Forest staff is maintained at a total monthly cost of £98 (Rs. 980), three forest rangers costing £19 (Rs. 190), one on £8 (Rs. 80), one on £6 (Rs. 60), and one on £5 (Rs. 50), five foresters costing £19 (Rs. 190), four of them on £4 (Rs. 40) each and one on £3 (Rs. 30), and sixty forest guards costing £60 (Rs. 600), twenty of them on £1 4*s.* (Rs. 12) each and forty on 18*s.* (Rs. 9) each. The coast depôt is maintained at a total monthly cost of £23 12*s.* (Rs. 236), two forest rangers costing £17 10*s.* (Rs. 175), one on £10 (Rs. 100) and one on £7 10*s.* (Rs. 75), one forester costing £2 10*s.* (Rs. 25), and six forest guards costing £3 12*s.* (Rs. 36). The inland depôt is maintained at a total monthly cost of £19 16*s.* (Rs. 198), six foresters costing £15 (Rs. 150), three of them on £3 (Rs. 30) each and three on £2 (Rs. 20) each, and six forest guards costing £4 16*s.* (Rs. 48).

Chapter II. Production. Forests.

compares the contents of the cart with the passes, endorses the white pass and gives it back to the cartman, and takes and returns the green pass to the issuing officer, endorsing on it the date of examination.

Settlement.

In March 1879, under the Indian Forest Act (No. VII of 1878), of a total of 3514·35 square miles of forest, 466·30 in Haliyál and Kárwár were notified as reserved, and the rest (3048·05) as protected forest.[1] Since 1879, from the protected forests of Ankola, Mundgod, and Sirsi, Mr. W. H. Horsley, C.S., has selected a reserved area of 217·37 square miles. In Ankola Mr. Horsley reserved the forests of twenty-four villages with an area of 128·21 square miles and left as protected the forests of thirty-seven villages with an area of 116·83 square miles. In Mundgod he reserved the forests of fifteen villages with an area of 55·15 square miles and left as protected the forests of seventy-six villages with an area of 106·72 square miles. In Sirsi he reserved the forests of nineteen villages with an area of 34·01 square miles, and left as protected the forests of 103 villages with an area of 665·98 square miles.[2]

Rules have been framed for the management of the protected forests,[3] and in these forests nineteen kinds of trees and four forest products have been reserved to Government.[4]

Forest Privileges.

Of the forest privileges exercised by the people, the chief are clearing patches of the forest for wood-ash or *kumri* tillage, lopping leaves for manuring spice and betel gardens, growing pepper in certain evergreen forests, free grazing, and free or cheap wood and fuel. The clearing and burning of forest patches for the growth of hill grains was formerly general and caused great damage to the forests. The practice has been discouraged for many years. It could not at once be stopped without causing hardship and suffering, but the area is being gradually reduced, and, in time, the practice will cease.[5] Formerly the owners of spice and betel gardens held large tracts of forest near their gardens called *betta* which

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[1] Government Gazette 6th March 1879. 251·86 square miles in Haliyál and 214·44 square miles in Kárwár were marked off in 1876 as reserved by Mr. E. J. Ebden, C.S. The increase of 34·59 square miles in the 1882 forest area given at page 21 is due to the completion of the forest settlement of Ankola and Mundgod and the difference found between actual and approximate measurements.

[2] Mr. Horsley's proposals were sanctioned under Government Resolution 5569, 20th October 1880.

[3] These rules are given in the Appendix.

[4] The nineteen kinds of trees are, teak, *sáyván*, Tectona grandis; sandalwood, *gandadamara*, Santalum album; blackwood, *shisam*, Dalbergia latifolia; ebony, *abnus*, Diospyros Ebenum; *honi*, Pterocarpus Marsupium; poon, *surhoni*, Calophyllum elatum; jack-tree, *phanas*, Artocarpus integrifolia; *pat-phanas*, Artocarpus hirsuta; *balghay*, Vitex altissima; *karimutal*, Ougeinia dalbergioides; *nána*, Lagerstrœmia microcarpa; *shivani*, Gmelina arborea; *matti*, Terminalia tomentosa; *hirda*, Terminalia Chebula; *jamba*, Xylia dolabriformis; *bendi*, Thespesia populnea; *khair*, Acacia Catechu; *shigikai*, Acacia concinna; and *ippe mara*, Bassia latifolia. The four forest products are *hirda* or myrobalans, the fruit of the Terminalia Chebula; *shigikai* or soap-pods, the fruit of the Acacia concinna; *ippe huva*, the flowers of the *moha* or Bassia latifolia; and *káth* or Catechu, the produce of the Acacia Catechu.

[5] As regards the right of clearing land for wood-ash tillage, one Sántáya Shánaya in 1874 brought a suit against Government to restore his right to wood-ash tillage which had been granted to his father in 1809 and withdrawn in 1861. The Judge decided for the plaintiff whose claim was finally settled by the payment of £400 (Rs. 4000).

Forests.

Forest Privileges.

they were allowed to lop and strip for leaf manure. In 1867 the area allotted for leaf manure was limited to eight times the area of the garden. The ownership of Government in certain trees in these patches has also been enforced, the pollarding and stripping have been confined to certain kinds of timber, and the cutting of any trees without leave has been made penal. The people have always been allowed to grow the pepper-vine in certain evergreen or *kán* forests, but this does not carry with it any right in the trees. The people have always enjoyed free grazing in certain parts of the forests. Under the survey settlement in each village certain numbers have been set apart for free grazing. All classes are allowed to take free of charge, for their private use, bamboos, poor timber fit to build huts and cattle sheds, head-loads of firewood, grass and fallen leaves for manure, thorns, brushwood, and stakes for hedges and dams, wood for field tools, and dead sago and other palms for water-courses. They are also given good building timber at from one-eighth to a quarter of the market price, and they are allowed to take larger quantities than head-loads of fuel on paying a fee of 6*d.* (4 *as.*) a cart-load.

In occupied arable land, teak, blackwood, and sandalwood, and such other trees as are specially entered in the village register, are Government property. Formerly Government claimed only the first cutting of these trees, but, since 1878, the interest of Government has been extended to all future growths. All other trees in a man's holding are his property. In surveyed villages he may cut them and dispose of them as he pleases.[1] But if he sells his trees he forfeits his claim to get wood for nothing or at specially low rates.

Forest Working.

Above and below the Sahyádris the system of working the forests is the same. The forest officer fixes what trees are to be cut, and keeps a register of them; contractors tender to cut the trees and carry the timber to the Government wood stores; and the superintendent of the stores checks the quantities brought by the contractor with the entries in the original register, arranges the timber in lots, and disposes of it to dealers or to private persons at auction or private sales. Though the system is the same, different conditions have caused such a variety in detail that separate accounts are required of the practice above and below the Sahyádris.

System.

In the forests above the Sahyádris a ranger, or competent forester, chooses the trees to be cut in his charge, numbers them, and enters in a register the kind of tree, its position and probable cubic contents, and the number of logs into which it should be cut. Tenders are then invited for felling, cutting, and carrying the marked trees to the wood stores. The contractors are of different classes, mostly Bráhmans or other well-to-do people of the neighbourhood. The contractor whose tender is accepted has to give security, and the contract has to be written on stamped paper

[1] In unsurveyed villages men who have held land since before 1844 are allowed to cut their trees, except the state trees. But they have to get leave, and if they mean to export the timber, they must take out a pass.

Chapter II. Production. Forests. *System.*

and registered. When the contractor has made his arrangements he gives notice to the district forest officer, and a forester and guard are sent to keep watch. The felling, cutting into logs of convenient length, squaring, and carrying are done by labourers and cartmen. Elephants are not used. Except Bráhmans and Jains all the people of the forest villages, Maráthás, Lambánis, Sidis, Vadars, Dheds, and Musalmáns, are willing to work as woodmen and timber carriers.[1] But the only class which has special skill in forestry are the Vadars who are extremely clever both in handling the axe and in carrying the wood to the stores. Instead of the usual day wages Vadars insist on being paid by the piece at 1*s.* to 1*s.* 1½*d.* (8-9 *annas*) for every 12½ cubic feet of timber felled, sawn, and dressed. For carting and dragging the logs to the stores they charge 3¾*d.* to 5¼*d.* (2½-3½ *annas*) a mile according as the ground is smooth or rough. They use a curious low cart, almost entirely made of wood. The floor of the cart and the pole is in one piece of rough planking about four inches thick. The floor is from two to two and a half feet wide, and the pole is dressed to the required length. The yoke is made fast to the end of the pole with a lashing of *kumbia*, Careya arborea, bark. The body rests on a *dindal* wood axle about eighteen inches round into which it is fastened by two wooden pegs. The ends of the axle taper and are supported by a pair of low solid wooden wheels each of two or three pieces nailed with wooden pegs at the centre, where they are about four and a half inches thick and from which they gradually fine to two and a quarter inches at the rim. The hole to take the axle is fitted with an iron ring, the only iron in the cart, about four inches across, and made fast by a wooden linch-pin. Though rude the cart is well suited for difficult rugged roads. After the log has been cut into pieces of convenient size and squared, the pieces are measured, numbered, and entered in the register opposite the estimated cubic contents of the tree.

The logs are then carried along rough tracts cleared by the contractor to some of the main forest roads. The roads lead to timber stores, of which there are seven, at Haliyál, Yellápur, the Kannigeri saw-mills, Kirvatti, Mundgod, Kátur-Singanhalli, and Sirsi. At the stores the logs are remeasured, stamped with the store number, and classed into convenient lots. At Kannigeri, about four and a half miles north of Yellápur, in the heart of a great forest tract, steam saw-mills were established in 1875 at a cost of a little over £6000.[2] The mills have four plain and one cross cut saws and three engines each of twelve horse-power. They are in charge of a European sub-assistant conservator and a professional engineer at a yearly cost of £795. At first the saw mills yielded a handsome profit, but from want of demand the large profit fell to a small profit, and the small profit to a slight loss in 1880-81.[3] A revival of the former demand

[1] The day's wages vary for men from 6*d.* to 7½*d.* (4-5 *annas*), and for women and children from 3*d.* to 4½*d.* (2-3 *annas*). Before the 1877 famine wages were higher, 9*d.* to 1*s.* (6-8 *annas*) for men and 3*d.* to 5¼*d.* (2-3½ *annas*) for women and children.

[2] The amount was £6106 16*s.* (Rs. 61,068).

[3] The details are: In 1875-76 a profit of £1881, 1876-77 £666, 1877-78 £385, 1878-79 £389; in 1879-80 a loss of £222, in 1880-81 a loss of £227; and in 1881-82 a profit of £10.

has turned the loss into a profit of £10 (Rs. 100) in 1881-82. Even though worked at a small nominal loss the mills are valuable as they save a loss of twenty per cent caused by squaring the logs with the hand and as they supply wood in a state which, if not locally available, might be brought from Bombay. The chief kinds of timber kept in these stores are, teak, *matti*, *kindal*, *honi*, *jámba*, *hedde*, *nandi*, *karimuttal*, and sandalwood in Sirsi. During the five years ending 1880 the amount of timber in store averaged 147,562 cubic feet (*khandis* 11,805), valued at £15,346 (Rs. 1,53,460). Yearly sales of wood are made at each of these stores lasting from ten to twenty days. The first sale is at Haliyál in December and the last at Sirsi in February. Wood can be bought at any time at a slight advance on the rates at the last sale. Many landlords and husbandmen buy at auctions to meet their own wants. But the dealers, though they belong to no special class, are generally Musalmáns and Lingáyats from Hubli and Dhárwár. Of late, on account of the fall in the price of timber,[1] the dealers have found it difficult to get rid of their purchases, and there has been great delay in recovering outstandings. From the stores the main routes along which the timber passes east, are from Haliyál towards Belgaum, Dhárwár, and Hubli; from Yellápur, Kirvatti, and the Kannigeri saw-mills to Hubli and Dhárwár; and from Mundgod and Kátur-Singanhalli to Hubli, Tadas, Bankápur, and Hángal. Of late years the large sum of £23,204 10*s.* (Rs. 2,32,045) has been spent from forest funds in improving the roads above the Sahyádris. The important Haliyál-Yellápur and Haliyál-Supa roads are kept up by the forest department. Two serviceable bridges have been built over the Tattihalla and one over the Daugi, and one-half of the cost of the bridges over the Bedti, Tudgani, and Yerkanbail rivers between Yellápur and Sirsi, and of the Barchi bridge between Haliyál and Supa, has been met from forest funds.

In the forests below the Sahyádris a ranger chooses the trees to be cut, numbers them, and enters in a register the kind of tree, its position, and probable contents. When the list is ready a contract is given for girdling the trees by cutting through the sap into the heartwood, an operation which costs about 6*d.* (*annas* 4) a tree. This girdling kills the tree, the object being to lighten the timber and make it easier to float down the rivers. After the trees have dried for two or three seasons tenders are invited for cutting, dragging, and floating them to the coast stores. The contracts and the contractors are the same as in the upland forests, and when the contractor is ready to begin the same precaution of setting a forest guard to watch the felling is adopted. The felling begins in July or August. In addition to the workmen, who do not differ from those above the Sahyádris, except that there are no Vádars with their bullock carts, elephants are employed. These elephants, which come from the Malabár coast, are the property of the contractors, and cost from

[1] Teak fell from £2 (Rs. 20) the *khandi* (12½ cubic feet) during the seven years before the 1876 famine to £1 8*s.* (Rs. 14) in the five years ending 1880; blackwood fell from £1 10*s.* to £1 2*s.* (Rs. 15 - Rs. 11), and other timber from £1 8*s.* to £1 (Rs. 14 - Rs. 10).

Chapter II. Production.

Forests. *System.*

£200 to £500 (Rs.2000-Rs.5000) to buy; £1 (Rs.10) a day to hire; and 6*s.* (Rs. 3) a day to keep. Though well cared for, they are apt to strain themselves and deaths are not uncommon. Each elephant has his driver or *máhut*, who sits on his neck or on a pad on his back. But the elephant often works with no one on his back, and when a log gets into trouble the driver comes in front of the elephant and advises him in what they call elephant-talk. A single elephant, though not easily nor without risk of mishap, can manage a log twenty-five to thirty-five feet long and containing fifty to eighty cubic feet of timber. Larger logs require two elephants, and a contract of 150 to 500 logs, each containing sixty to 150 cubic feet of timber, should not be worked with less than two to six elephants. The timber has generally to be brought down steep hill sides or out of deep dells and over dry boulder-strewn watercourses to rough tracks cleared by the contractors. Up the steepest slopes and into the deepest rockiest dells the elephant unhesitatingly makes his way, and, tackling the largest logs, by pushing and dragging, overcomes every obstacle. Except that in dragging, a heavy hawser-like rope of green fibre[1] is made fast to the drag-holes and caught by the elephant between his teeth he is not harnessed to the log. In moving the log he slightly raises it and draws it alongside of him, always careful to be on the upper side and to keep the log so far from him that there is no risk of its striking his feet. In this way the elephant is much safer than if he was harnessed to the log, as, if the log becomes unmanageable, he can at once let it loose. When special force is required the elephant gets in front of the log with the rope between his teeth and twisting his trunk round the rope brings to bear all his power and weight, backing and hawling the log with him step by step. When two elephants work together one drags and the other pushes. Sometimes the log is pushed with the feet, but as a rule the elephant kneels and pushes it with his knees and with the middle of his skull. In this way the timber is dragged down the steep slopes chiefly to the Kálinadi and the Gangávali rivers. At the river side the logs are marked and measured, noted in the register opposite the original entries, and handed to the contractor who passes a receipt for them. Then between November and March, for after March the rivers run too low, they are floated singly down the river. In passing the logs down the river the elephant is again of great use. He pushes them one by one over the shallows, keeps them straight in rapids, and shoots them along narrow channels blasted in the rock[2]. To get water enough to float the logs through the rock cuttings the river is pounded back by a dam of stakes, leaves, grass, and earth. The logs come down this reach and knock together in hopeless confusion against the dam. One elephant stands nearly up to his middle at the mouth of the rock-cut passage. Another picks his way about among the jumble

[1] The fibre either of the *sárda* Sterculia villosa, or of the *kevan* Heticteres Isora, is generally used.

[2] These channels, which are from six to ten feet broad, have been cut through belts of rock by the forest department.

of logs, takes them one by one, and turning them straight up and down the stream passes them to the elephant at the mouth of the cut, who, with a strong push, sends a log of two or three tons dancing down the channel like an oar or a walking stick. Sometimes, when the elephant at the cut is busy with a big log, a second log comes down on him from behind. When this happens he plays the second log with his hind leg with marvellous skill, stopping its force and keeping it straight till the gap is clear and he is able to pass it on.

At Kadra on the Kálinadi and at Gundbale on the Gangâvali fifty to two hundred logs are put together and made into rafts which float with the tide down the Kálinadi to the Kodibág store or down the Gangávali river to the Gangávali store. When the rafts reach the store, elephants drag the timber above high-water mark. The logs are examined by the storekeeper and checked with the register. If all is correct the storekeeper re-measures and classifies the timber, and when the measurements are finished settles the contractors' accounts.[1] During the five years ending 1880 the quantity of wood kept in the two coast stores averaged 69,575 cubic feet (*khandis* 5566) worth £11,132 (Rs. 1,11,320). There are seldom auction sales at the coast stores. The timber, indented for by the Bombay Dockyard and Gun Carriage Factory, is set aside and sent to Bombay in native craft. The rest is sold to merchants and shipped chiefly to Bombay, Broach, and Bhávnagar.

Dead Wood.

Both in the lowland and in the upland forests dead wood contracts are sometimes arranged under the share system. The details are the same as in the contract system, except that in the lowland forests the contractors receive one-half of the sale proceeds for teak and five-eighths (10 *annas* in the rupee) for other timber. In the upland forests the contractor receives a share of three to five-sixteenths (3 to 5 *annas* in the rupee) both for teak and for other timber.

Local Use.

Besides the timber that is exported from the district a large quantity is cut to meet the local demand. Timber for local use is marked by forest officers and felled and removed under permit rules.[2] The grant of wood at from an eighth to a quarter of the market price to the people who live near the forests is an old feature in Kánara conservancy. During the five years ending 1882 the cuttings for local use have averaged 101,244 cubic feet (*khandis* 8099). To prevent fraud in measurement ten per cent of the wood stacked is checked by the foresters and ten per cent by the district forest officer. A further small percentage is examined by special patrol parties.

During the five years ending 1882, 1,601,027 cubic feet (128,082 *khandis*) of timber worth £126,013 (Rs. 12,60,130) have been taken out of the Kánara forests. Of this, 1,094,804 cubic feet (87,584 *khandis*) were for export and 506,223 cubic feet (40,498 *khandis*) for local use. The average yearly felling of wood was 320,205 cubic feet (25,616 *khandis*), of which 218,961 cubic feet (17,517

[1] Logs are often left behind from want of buoyancy. When this happens a certain amount is deducted from what is due to the contractors.

[2] These rules are given in the Appendix.

Chapter II. Production. Forests. *Minor Products.*

khandis) were for export and 101,244 cubic feet (8099 *khandis*) for local use.[1]

The minor products of the Kánara forests yield an average yearly revenue of about £5600 (Rs. 56,000). The chief articles are, myrobalans or *hirdas*, £4049 (Rs. 40,490); soapnuts or *shigikai*, £203 (Rs. 2030); catechu or *kát*, £364 (Rs. 3640); honey and wax, £339 (Rs. 3390); cinnamon, £156 (Rs. 1560); and pepper and grass, £501 (Rs. 5010). The right of gathering honey and wax, cinnamon, and pepper is farmed. The making of catechu from thickened *khair* juice was stopped for several years, but, in 1880, a small contract was granted in Honávar. The right of grazing was formerly put to auction. But the practice caused much damage to the forests, as the contractors crowded the forests with cattle and there was no check against the forest being fired to improve the grazing, or the boughs being lopped for fodder. In August 1880 a system was introduced in Supa of charging a grazing fee of 3*d*. (*annas* 2) on every head of cattle allowed into the forest. A ticket was also issued under which the holder engaged to lop no boughs and promised to do his best to check and put out forest fires. Any one found breaking this engagement is liable to have his cattle at once turned out of the forest. The scheme worked so well in Supa that it has been (August 1881) applied to the whole district. Besides the gain to the forests the new system is in many cases an advantage to the people who used to have to pay the contractor higher fees than they have now to pay. It also brings in a larger revenue, the receipts having risen from £300 and £400 (Rs. 3000-Rs. 4000) to £2658 (Rs. 26,580) in 1882.

Myrobalans and soapnuts are gathered by the forest department. Soapnuts, the fruit of the Acacia concinna, are of little value and are worth gathering only every second year. Myrobalans or *hirdás*, the fruit or nut of the Terminalia Chebula, the right to gather which had formerly been farmed, were first gathered by the forest department in 1877-78, when 2782 *khandis* of 560 pounds each were brought into the forest stores. The whole sold for £5106 (Rs. 51,060), leaving a net profit of £2959 (Rs. 29,590) compared with a yearly average revenue of £656 (Rs. 6560) in the seven previous years. During the three following years the average receipts have been £3697 (Rs. 36,970) and the charges £2238 (Rs. 22,380), leaving a net yearly balance of £1457 (Rs. 14,570). The decline in the revenue is due to the fall in the demand for myrobalans.[2] The demand for myrobalans has had the excellent effect of tempting the hill tribes to take care of the *hirda* trees, not lopping or cutting them, and when possible saving them from forest fires. Taking advantage of the increased value of the *hirda* the Conservator has proposed that the land set apart for wood-ash tillage should be granted rent-free on

[1] Before the 1877 famine the average felling of timber for export was 245,932 cubic feet (19,674 *khandis*), and for local use 124,832 cubic feet (9986 *khandis*).

[2] In 1878 the war between Russia and Turkey is said to have injured the trade in *vallonea* or gallnuts, the acorn cups of Quercus ægilops, and raised an unusual demand for myrobalans. Another, perhaps a more important, element in the increased demand was the low freights to England, there being next to no produce to send at the end of the famine.

Forests.

Minor Products.

condition that the holder stocks it with a certain number of *hirda* plants to be supplied to him from the Government nurseries. This plan has worked well in Belgaum. Besides this scheme for re-clothing the forest tracts which have been laid bare by wood-ash tillage since 1857, attention has been given to the growth of plantations, chiefly of teak. About 1000 acres, partly above and partly below the Sahyádris, have been planted with about a million of young trees. Except 100 acres of Casuarinas, on the coast between Kárwár and the Kálinadi, these plantations have been stocked with teak at a cost, including the purchase money of the ground, of £8000 (Rs. 80,000).

Roadside Trees.

As most roads run through shady forests, roadside trees are not so important in Kánara as in other districts. Only along some parts of the coast is there a need of roadside trees. The most useful trees for road planting are, above the Sahyádris, the mango, the jack, the *dhupadamara* Vateria indica, and the fig family, especially the banian, as poles five or six feet long and a foot in girth grow readily if planted at the beginning of the rains in pits eighteen or twenty inches deep. The *dhupadamara* Vateria indica, with its splendid shade and sweet white flowers, is a beautiful roadside tree, and grows well above the Sahyádris wherever the soil is red. There are magnificent *dhupadamara* avenues in Siddápur planted probably in the beginning of the present century by the Bilgi chiefs. The trees are of grand height and some of them are from ten to fifteen feet in girth. Below the Sahyádris, wherever the soil is sandy, no tree thrives better than the Casuarina, which quickly grows into a handsome tree. In Honávar are fine banians which were planted when Kánara was under the Madras Government.

Experiments.

Of exotics several varieties of the Eucalyptus, the Pithecolobium saman, the mahogany, and the Cæsalpinia coriaria or *divi-divi* are being tried. Except the Eucalypti, which do not prosper, these trees are doing well. Near the Gersappa falls are a few Cinchona trees, some of which were planted by a Madras doctor about eighteen years ago and the rest have been added since. None of the plants thrive.

Finances.

The following statement shows the receipts, charges, and profits of the Kánara forests during the twenty-nine years ending 1881-82:

Kánara Forest Balance Sheet, 1853-1881.

Year.	Receipts.	Charges.	Profits.	Year.	Receipts.	Charges.	Profits.
	£.	£.	£.		£.	£.	£.
1853-54 ...	14,423	5685	8738	1868-69 ...	36,312	15,895	20,417
1854-55 ...	8501	6379	2122	1869-70 ...	50,327	13,804	36,523
1855-56 ...	15,061	3913	11,148	1870-71 ...	40,640	16,913	23,727
1856-57 ...	16,064	5097	10,967	1871-72 ...	45,367	13,314	32,053
1857-58 ...	7065	2935	4130	1872-73 ...	42,077	23,646	18,431
1858-59 ...	10,060	4080	5980	1873-74 ...	40,404	16,548	23,856
1859-60 ...	20,450	5980	14,470	1874-75 ...	35,724	19,002	16,722
1860-61 ...	25,316	7839	17,477	1875-76 ...	38,882	19,450	19,432
1861-62 ...	8330	7592	738	1876-77 ...	34,281	19,423	14,858
1862-63 ...	36,264	4805	31,459	1877-78 ...	23,924	18,247	5677
1863-64 ...	33,872	3222	30,650	1878-79 ...	24,517	22,255	2262
1864-65 ...	41,972	7485	34,487	1879-80 ...	35,024	17,384	17,640
1865-66 ...	26,995	23,545	3450	1880-81 ...	32,906	20,818	12,088
1866-67 ...	28,368	17,986	10,382	1881-82 ...	41,051	24,387	16,664
1867-68 ...	29,960	14,070	15,890				

An examination of this balance sheet shows that for the nine years ending 1861-62 receipts averaged £13,900, charges £5500,

Chapter II. Production. Forests. *Finances.*

and profits £8400. In the ten years ending 1871-72 receipts averaged £37,000, charges £13,100 and profits £23,900; and in the ten years ending 1881-82 receipts averaged £34,900, charges £20,100, and profits £14,800. In 1877-78 and 1878-79 the profits were greatly below the average, only £5677 and £2262. Between 1862 and 1864 the great wealth which the American war threw into Bombay and the districts of Belgaum and Dhárwár was accompanied by an immense demand for wood and raised the forest receipts from an average of £13,900 in the nine years ending 1862 to £41,900 in 1864-65. At the close of the American war the receipts fell to £27,000 in 1865-66 and £28,000 in 1866-67. But again in 1869-70 the special demand for the Belgaum barracks and the state buildings at Kolhápur raised the receipts to £50,000. From this they fell, but continued over £34,000 till, in consequence of the 1876 famine, the demand for timber ceased and the receipts dropped to £24,000 in 1877-78 and £24,500 in 1878-79. The return to a more prosperous state in 1879-80 was accompanied by a rise in receipts to £35,000. Charges have risen from an average of about £5400 in the twelve years ending 1864-65 to an average of about £18,600 in the seventeen years since 1865. Before 1865 there was little or no establishment and little or no guarding of the forests. Nothing was looked for but profit. Another twelve years of this system would have ended in disaster. Since 1865 there has been no great increase in the permanent staff. The rise from an average of about £18,000 in the five previous years to £22,255 in 1878-79 was owing to the cost (£4369) of an important forest case.[1] In 1881-82 both receipts and charges increased considerably, receipts to £41,000 against £32,900 in 1880-81 and charges to £24,400 against £20,800 in 1880-81.

Forest Details.

The detailed accounts of the different forest blocks and groups may be given in the following order: Those of Haliyál, Supa, and Kárwár in the northern division; those of Yellápur, Mundgod, Ankola, and Kumta in the central division; and those of Sirsi, Siddápur, Honávar, and Bhatkal in the southern division. In Haliyál and Kárwár in the north division all of the forests, and in Mundgod and Ankola in the central division and in Sirsi in the south division, portions of the forests have been reserved. In Supa in the north, in Yellápur and Kumta in the centre, and in Siddápur, Honávar, and Bhatkal in the south, reserved forests have still to be set apart.

Haliyál.

The Haliyál forests in the north-east of the district include the forest lands of 138 villages with an area of 251·86 square miles or 161,191 acres, and a population of about 28,000. They are bounded on the north by Bidi in Belgaum; on the east by Dhárwár; on the south by the Tattihalla and Kálinadi rivers; and on the west by the Katnal and Barchi streams up to the Kálinadi, and thence by the hills that run north and south between the Kálinadi and the Káneri. Over the whole area teak and other leaf-shedding trees prevail in perfection of size and quality, except in the dryer east, where they do not grow

[1] This suit was brought by one Bháskar Appa to recover about 350 square miles of forests from which, he alleged, he had been wrongfully ejected by the Collector in 1861. The Judge found in favour of Government and his decision was upheld on appeal by the High Court.